AGRICULTURAL NEWS LETTER

VOL. 21-NO. 3 MAY-JUNE, 1953

This publication contains information regarding new developments of interest to agriculture based on laboratory and field investigations by the Du Pont Company. It also contains published reports of investigators at agricultural experiment stations and other institutions as related to the Company's products and other subjects of agricultural interest.

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ISSUED BY PUBLIC RELATIONS DEPARTMENT, E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DEL.

AGRICULTURAL NEWS LETTER

Published bi-monthly by the
Extension Division, Public Relations Department

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Wilmington 98, Delaware

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This publication is available on microfilm. Beginning with Volume 17 (1949), it may be obtained in this form from University Microfilms, 313 North First Street, Ann Arbor, Michigan. The cost is $1.50 per volume, plus 10 cents for packing and mailing. All orders should be sent to Ann Arbor.

WHAT FARM EDITORS ARE SAYING:

"Let the buyer beware" and "dog eat dog" were once precepts in many businesses. No great and enduring industry could be built that way. As experience taught men that business morals pay, great enterprises arose; and they serve the people well by fair and honest dealing.
--Wheeler McMillan in FARM JOURNAL

Don't get too nervous about the present slide in prices. We think that most of the shakedown has already taken place. But a big debt load is dangerous. If you already have it, get refinanced on a long term basis. Keep your debt burden light.
--WISCONSIN AGRICULTURIST & FARMER

Note to farm women: If you don't have a water system in the house, bear down on the old man on this subject. If you're a renter's wife, you have two men to convince: your husband and the landlord. But it can be done.
--WALLACES FARMER & IOWA HOMSTEAD

IN THIS ISSUE

It always makes me wonder when I see the figures showing how little milk and other dairy products are used in the families of thousands of dairy farmers. If milk is a relatively low-priced food at 20 cents or more a quart, as we are told by the health people, then certainly it is the best food buy in the world to the dairyman at 10 cents a quart.
--E. R. Eastman in AMERICAN AGRICULTURIST

"As Woodrow Wilson implied, liberty depends on the ability of citizens to restrain governments."
--KANSAS FARMER, quoting Allan B. Kline of the Farm Bureau

Research and education is the foundation of a free agricultural people. Research is creative, inventive, productive. Throughout history, only free people have ever made tremendous progress in research.
-- Herb Schaller in BETTER FARMING METHODS

New Drug Available to Treat....

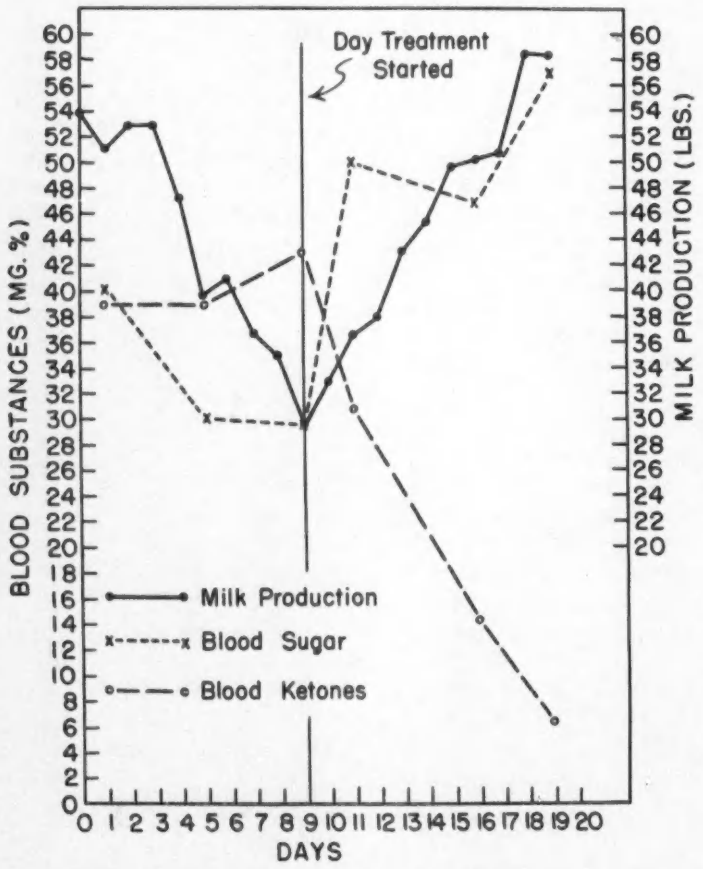
KETOSIS IN DAIRY CATTLE

A promising remedy for a disease which has been seriously shortening the nation's milk supply in recent years has been developed through research work at two college experiment stations.

The disease is ketosis, better known by dairymen in some sections as acetonemia. The drug which experiments have shown to be a valuable tool in controlling this disease is sodium propionate.

Ketosis is the result of an upset metabolism in the dairy cow -- a condition in which the level of ketone bodies in the blood is abnormally high, while blood sugar values are low. Milk production falls markedly and the appetite of the cow becomes poor.

This disease usually occurs ten days to six weeks after calving. The decreased milk flow and lack of appetite are accompanied by a loss of weight and sometimes constipation. The animal is usually dull and listless, but occasionally may show high excitability and nervousness.



The above chart shows the effect of a quarter-pound daily dosage of sodium propionate on the milk production and blood picture of a cow with ketosis in Dr. Schultz' New York experiments.

Experimental Data

Dr. L. H. Schultz of the Department of Animal Husbandry, New York State College of Agriculture, was the first to experiment with sodium propionate. He has carried out experiments on 24 individual cases of ketosis in dairy cattle. All animals were treated daily with two, four, or eight ounces of sodium propionate divided into two doses. There was an increase in all cases in blood sugar and milk production, and a decrease in all but one case in blood ketones. Appetite usually improved in one to two days.

The treatment period varied from one to 38 days, with most cases lasting for two to 10 days. Dr. Schultz concludes that in mild cases,

feeding four ounces of sodium propionate daily in the grain apparently was effective, but in more severe cases eight ounces daily as a drench seemed to give the best results.

Confirming work with this drug has been done by Dr. J. C. Shaw at the Agricultural Experiment Station, University of Maryland. He concluded that eight to ten or more days of treatment was necessary to get good results and prevent relapse. In some tests, Dr. Shaw found that an initial treatment with one gram of cortisone, followed by half-pound doses of sodium propionate daily for a week, was very effective. In one case, an initial glucose injection followed by the drug brought good response.

Evidence on Toxicity

Sodium propionate is a safe chemical for treatment of cattle. It is the least toxic of the salts of the fatty acids and has been described as "virtually non-toxic". It is not irritating to the skin and can be taken internally in large doses without ill effects. It does not lead to allergies or sensitivities.

Dr. Shaw has fed sodium propionate to two normal Holstein cows at the rate of a pound per day for a period of two weeks without any adverse effect. Dr. Schultz administered a quarter-pound of sodium propionate to a 75-pound goat with no apparent ill effects. This dose (3320 milograms per kilogram of body weight) is more than 10 times the amount recommended as a daily dose for a dairy cow.

Sodium propionate (in the ionized form) is a normal ingredient of the rumen contents of the dairy cow. It is produced by the action of the rumen flora on carbohydrates during normal digestion. It has been shown that it is absorbed directly into the blood stream from the rumen, reticulum, and omasum, and that its breakdown in the body leads only to the production of normal body constituents and not to production of toxic materials or abnormal conditions.

Diagnosis Problem

Ketosis is sometimes confused with other diseases of dairy animals such as milk fever and retained placenta, for which this drug is not usually beneficial. On the other hand, sodium propionate will not be harmful. If there is a question about the diagnoses, a veterinarian should be consulted. This is particularly necessary should the cow become sick or "go down" within a week after calving.

The Du Pont Company, which produces sodium propionate, is offering a drug grade of this chemical to suppliers of livestock remedies throughout the country. It is expected to be generally available through dairy supply stores and veterinary supply houses by mid-summer.

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EDITOR'S NOTE: For further information regarding veterinary uses of sodium propionate, contact the Animal Industry Division, Grasselli Chemicals Department, Du Pont Company.

"RESEARCH -- STARTING POINT OF FARM PROGRESS"

by Dr. Wallace E. Gordon
E. I. du Pont de Nemours & Co., Inc.

We hear a lot these days about the "fifth plate" -- for that extra person who will be sitting at every American table for four by 1975. People are asking: "Where is the food coming from to fill this fifth plate?"

If population forecasters are right, our agricultural production will have to increase 20 per cent to feed the next generation as well as we are eating now. But the forecasters may be wrong. About 150 years ago an Englishman named Malthus calculated that by now the world would have begun to over-populate itself into starvation. In the early thirties, another forecast indicated that United States population was levelling off. We already have more people in the United States than that mathematician figured we would have in 1980!

Let's assume for a moment that the present high birth-rate will continue -- till 1975 and into the years beyond that. It means a big demand for food.

Populations Follow Food

In the past, big demands for food have led to drastic changes in the lives of many people. For example, when the Irish potato crop failed in 1845, hundreds of thousands left their native country to find homes and abundance in the New World. As eastern population increased, people moved west, opening new land and advancing the frontier.

In World War I, American farmers expanded their production by putting vast acreages of land into cash crops -- and you all know the years of distress that followed when the war-time market collapsed.

When a second World War again demanded the utmost of farmers, they increased production by nearly one-third, which was about the limit of our production capacity at that time.

Where Do We Go?

If we have to raise our sights to feed a permanently expanding population, where shall we turn this time? There are no new frontiers of first-rate land to be opened up. Drastic adjustments can again be made -- it's true. Only a little more than one-fifth of our land area is now being used for crops. Millions more acres could be put into cultivation -- but the investment for irrigation alone would be staggering.

Or we might change our eating habits. Our present diet, with its high proportion of meat, milk and eggs, requires a lot of land per person for hay, pasture and feed grains for our herds and flocks. The same land in staple crops would feed a larger population on a simpler diet.

Another answer might be to put more hands to till the soil. Such countries as Japan, India, Holland, Denmark, and even England and Wales utilize

proportionally much more farm labor than the United States -- and get higher production per acre than we do, in spite of our widespread use of farm machinery.

Should We Upset Our Lives?

Such radical changes in our methods of agricultural production would cause a big change in our way of living, increase the public debt, upset our economic structure, and probably take the management of farms almost completely out of the hands of farmers.

And there would be no end to it. Once committed to a course of trying to foresee everything, we would have to continue with more planning, to adjust for the miscalculations of today's prophets, and to provide for the needs forecast for the next century.

In this country, each farmer now raises enough to feed himself and about 15 others. And there are 7,000 new babies to be fed in the United States every morning of the year. New farmers and new farms can't be created fast enough to keep the ratio unchanged.

"Better Food For More People"

I, for one, do not believe we can set our sights on a lower standard of living. We must reject any solution that is based on a less abundant diet for the American people. Our goal must continue to be better food for more people. The challenge that faces us all is to find ways to increase the productivity of the individual farmer.

At the same time we must avoid putting farmers at a disadvantage in the total national economy. Government programs alone won't do the job. We need a steady level of prices, high employment and production and increasing output per worker in agriculture, and in business and industry as well.

Through more application of science to agriculture, I believe we can meet the unknown food requirements of tomorrow's uncounted children without committing ourselves to any drastic and upsetting master plans. Our problem is to find new ways to apply research to agricultural production and teach approximately the present number of farmers to use new scientific knowledge on approximately the present area of cropland.

Freedom From Serfdom

Looking beyond the borders of our own nation, advances in farm technology may free millions of people from the life of the serf, the peasant, and the coolie -- making their herds and flocks and fields so productive that proportionately fewer people will be required to produce the necessities of life, and proportionately more will be available for producing those goods which we ordinarily term comforts and luxuries, instead of necessities.

This has been our course in the United States, and it is the course that has led to our high standard of living. Since 1920, our cropland area in the United States has remained almost exactly 400 million acres. But output is nearly half again what it was then. About a third of the increase has been

achieved by mechanization and the release of huge acreages that once produced feed for farm work animals. The remaining two-thirds of the increase in farm output has been due largely to the application of biological and chemical research to agriculture.

Many branches of science have been applied to agriculture -- chemistry, engineering, genetics of plants and animals, agronomy, meteorology, veterinary medicine, economics.

Spreading Knowledge

Farm boys talk in familiar terms of subjects that were only laboratory curiosities a generation ago. Good roads take them to modern schools. Newspapers, radio, television, books, and magazines bring new ideas into farm homes almost immediately -- which means that new knowledge spreads faster than it used to.

Since I am a chemist, and represent a chemical company, I want to review a few of the recent achievements in chemical technology and give you some idea of where our research is leading us -- as we apply new chemicals to the life processes of plants and animals -- and to the soil itself.

When 2,4-D first came into use, it seemed impossible that a chemical sprayed on a field of growing wheat or oats could kill weeds without harming the crop. Now, with other compounds, this same principle is being extended to sugar beets, alfalfa, and even to vegetables.

Modern Chemical Tools

Before the war, when blight appeared in the Red River Valley, the potato grower usually had to choose between letting the disease run its course or using caustic fungicides that might do even more damage than the disease. Now he can use mild, protective fungicides that prevent the diseases from getting established, and save the full strength of the growing plant for producing the crop.

Along with our pest control research we are getting more deeply into the study of chemicals that nourish plants and animals, regulate their growth, and give them resistance or immunity to infection. Vitamins and antibiotics have captured a good deal of public interest in this field. Amino acids, the building blocks of protein, are perhaps even more fundamental. Chemical factories are now synthesizing amino acids on a commercial scale, for poultry feeds.

One of these amino acids is methionine. In a ration where the protein is perfectly balanced, mathematically, methionine improves the utilization of feed, so that birds require less feed per pound of gain. If proper amounts -- a pound or so -- of methionine were added to every ton of turkey, broiler, and starter mash now used in the country, enough feed would be saved to produce over 375 million more pounds of poultry meat per year. If similar results can be produced with similar materials in hog and cattle feeds, think what it will mean in terms of more effective utilization of grain, hay and pasture, and in the production of meat and livestock products in the future.

Bugs in the Hayfield

With current emphasis on grassland farming and the production of such legumes as alfalfa and clover we are finding that they too respond to chemicals. Hayfields and pasture are no longer the wasteland of the farm -- they are sometimes the most productive cropland.

Spraying insecticides on alfalfa and clover may become as common as it is on potatoes, as we learn how much insects in our hayfields and pastures are costing us. Those little masses of froth that you see in the fields early in the spring -- on leaves and stems -- hide insects called spittlebugs, which may cut yields as much as half a ton or more to the acre. And perhaps you've seen clouds of leafhoppers fly up in front of the cutter bar as you drive your mowing machine through the hayfield. They too feed on the crop that rightfully belongs to your cattle. With new insecticides, you can spray the field without hazard to people or animals -- and without danger that any toxic residues will show up in meat or milk.

In our company, we have a program of fundamental chemical research, where chemists are finding new ways to arrange atoms and molecules to produce new chemical compounds. Some of them get pretty complicated. You know that water is H_2O, meaning that it has two atoms of hydrogen and one of oxygen. Our new weed killer is 3-(p-chlorophenyl)-1,1-dimethylurea, and the formula that corresponds to H_2O is $C_9H_{11}ClN_2O$. We have named it CMU for short.

Proving New Chemicals

But synthesizing a new compound with a long forbidding name is only the beginning. Research is economically important only if it produces useful goods. So, when new compounds come out of the laboratory, we put them through a battery of "screening tests" to learn whether they have any use in agriculture.

In some of these tests we simply try to find whether these new chemicals will do a job that other chemicals are already doing -- but do it better. So we test their effects as insecticides, as weed killers, and also as fungicides that might control potato blight or wheat smut.

We also keep in touch with the needs of agriculture to learn where chemicals might be used in ways that have never been used before. Chemical soil conditioners are one example. Growth regulators for plants and animals are another.

Must Know the Problems

In short, we can't make the most of our research with new chemical compounds unless we know the agricultural problems that might possibly be approached through chemistry. We also have to know why chemicals act the way they do when applied to plants, animals and the soil. Answering some of these questions may lead us into a new discovery.

In our agricultural research, about one chemical in 1500 developed in the laboratory finally rings the bell as being of commercial value to farmers. The other 1499 have to be charged up to experience.

Most of our topflight agricultural technical men grew up on a farm somewhere -- studied at a state college of agriculture and brought to their jobs in our company the practical knowledge of farming and the scientific training which it takes to make agricultural research pay off - for industry and for agriculture.

Responsibilities of Industry

The manufacturer's responsibility does not end when he has put the products on the market. We have to see that our products reach enough wholesalers and dealers so that they will be available where farmers can buy them conveniently. We have to get word to farmers through advertisements in newspapers and farm magazines and radio and television. We have to equip the wholesalers and dealers with handbooks and manuals and leaflets that tell them what they are selling, and tell you what you are buying and how to use it.

We can visualize a new and boundless frontier for agriculture. The geographical frontier of preceding generations has largely vanished. In its place has come the new frontier of science, which we have only begun to explore, and which is limited only by the capacity of the mind of man.

Three Research Fields

In the future of chemical research, three main lines of development appear most promising.

The first is the prevention of crop losses due to weeds, diseases, insects and parasites. In 1951, dollar losses due to insects, weeds and disease of plants and animals are estimated to have equalled from one-quarter to one-third of the total gross cash farm income for the country. There is every reason to expect that chemical research can reduce these losses to the point where they are negligible. New concepts of pest control are on the horizon.

Second, we can expect that combined research in chemistry and biology can develop faster growing and more nutritious crop plants and animals.

Finally, we expect to advance our knowledge of the soil itself. Work with chemical soil-conditioners leads us to believe that chemicals may take over or supplement some of the important functions of naturally occurring organic soil materials. Observations like this are important not only for efficient crop production, but to help deal with the problem of soil erosion.

What Soils Are Telling Us

Soil studies have already shown that we are not dealing simply with the physical ingredients and condition of the soil but that there are important biological factors to be considered in soil research. Some of the most powerful antibiotic drugs have been derived from soil organisms which exist nowhere else in nature. We know that seed treatment helps offset the effect of harmful fungous organisms in the soil -- but we still have a lot to learn about them.

As our studies come closer and closer to understanding the mysteries of the life processes of plants and animals, we will find more and more places

where we can supply certain chemicals at the right time to help Nature produce bigger and better harvests.

As long as we are free to conduct independent research, and to obtain a reward for productive enterprise, business and industry will continue to explore the unknown, and farmers will have the freedom to put new discoveries to work. The risks and the competition are great, but so are the incentives. None of us can stand still in this changing world. We don't want to turn backward, so we must go forward. And much of our progress will be measured by our ability to find new ways to produce better products at less cost.

Incentives and Dreams

The traditions of our farm people set a high value on individual initiative, self-reliance and competitive enterprise. They know how incentives bring out man's best productive effort -- the incentives that lead a father to dream that his son can be far more successful than the old man has been, and lead him to work to make that dream come true.

Anything which weakens these incentives -- whether it be government controls, excessive taxes, or restriction of individual liberty -- is a matter of grave concern to all of us, because a weakening of incentive is a weakening of man's will to accomplishment.

So -- as we look to the future in research and education in farm technology, we hope that strong incentives to productive work with hands and minds will prevail. And as long as men's minds remain free to learn, we see no limit to what can be taught.

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EDITOR'S NOTE -- The preceding article was condensed from an address delivered before the recent Farm Forum in Minneapolis by Dr. W. E. Gordon of Du Pont's Grasselli Chemicals Department. Printed copies of the entire address are available and may be obtained by writing to AGRICULTURAL NEWS LETTER, Public Relations Department, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware.

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SOUTH AFRICAN SHEEP DISEASE FOUND IN CALIFORNIA -- Blue-tongue, a disease which has caused heavy losses to flocks in the Union of South Africa since 1876, has been positively identified from cultures obtained from diseased California sheep. It is a virus disease, spread by biting insects. Diseased animals run a fever, their nose, tongue, gums, and throat become swollen and inflamed, they become stiff and lame. Some 325,000 sheep in California are involved, and similar symptoms have been reported from Utah and Texas flocks. In South Africa, mortality rates have run as high as 90 per cent.

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SUPPLEMENTARY NITROGEN APPLICATION INCREASES YIELD OF VEGETABLE CROPS

By Epes W. Sargent

Most vegetable crops have relatively low nitrogen requirements until they approach maturity. While actual requirements vary from one type of vegetable to another, the pattern is essentially the same for all of them. In general, most vegetables absorb 10 per cent of their total nitrogen requirements in the first quarter of the growth period, 20 per cent in the second quarter, 40 per cent in the third quarter, and the remaining 30 per cent from then until harvest.

Based on this information, experimental work performed in widely scattered sections of the country over the last few years has proven that supplementary applications of nitrogen in the form of urea ("NuGreen" fertilizer compound) will result in higher yields than are obtained from control crops on which only initial fertilization is employed.

Conventional methods of fertilization generally include an application of commercial mixed fertilizer at planting time and a subsequent application of either commercial mixed fertilizer or nitrogen in some form after a few weeks of growth. The disadvantages encountered in this method are two-fold. In the first place if adequate nitrogen for the season is applied initially, there is considerable danger of much of the nitrogen being leached from the soil before the vegetables are ready to make maximum use of it. Secondly, the fact that large quantities of nitrogen are available early in the growth period may stimulate an undesirable development. For example, carrots which have an early excess of nitrogen tend toward over development of top growth at the expense of root growth later in the cycle.

Because "NuGreen", which supplies 45 per cent of its weight in nitrogen, lends itself to foliage spraying and distribution through irrigation water, it has been used effectively at all stages of plant development. The fact that it is compatible with most pesticides makes it possible to add nitrogen in this form whenever pesticides are sprayed, with very little additional effort.

TABLE I

CONCENTRATION OF "NUGREEN"
Foliage Sprays

Lbs. "NuGreen" per 100 gals.	Crops
4 to 5	Tomatoes, cucumbers, cabbage, cauliflower, celery, lettuce, peppers, snap beans, sweet corn, strawberries
5 to 10	Sweet potatoes
15	Potatoes
20	Carrots, parsley

Data compiled from tests throughout the country show that 30 to 75 pounds of "NuGreen" can be applied per acre in regular pest control spray mixtures. Table I gives the safe maximum concentration of this material for vegetables when used in foliage sprays.

Top dressing through irrigation water can supply from 80 to 160 pounds of "NuGreen" per acre. Table II shows the amount required to supply varying amounts of nitrogen in any one application. The methods used for application through irrigation water so far call for dissolving an 80-pound bag of the material in 40 gallons of water. In low pressure systems this solution has been introduced at the suction side of the pump; high pressure systems call for injecting the solution into the discharge side with a pressure system or hydraulic injector.

TABLE II

IRRIGATION AND TOP DRESSING

From 80 to 160 pounds of "NuGreen" per acre is recommended for top-dressing vegetables -- applied through irrigation water, or in ground or air equipment.

Pounds of "NuGreen"	Number of Bags of "NuGreen"	Pounds of Nitrogen
40	½	18
80	1	36
120	1½	54
160	2	72

The number of applications of "NuGreen" is determined by the total supplemental nitrogen needed. Best results have been obtained when applications have been sprayed at intervals of a week or more. These should be made during the period of maximum need.

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SHIPPING LOSSES TO BE PROBED -- Losses due to improper handling of farm products in transit are due for closer scrutiny by the Transportation Research Advisory Committee of USDA. Damage to watermelons in transit will be given special study to see if better loading methods can be worked out. Railway refrigeration of produce, livestock losses caused by transportation bruises, and assembling of milk on farms for tank truck hauling are other items to receive more attention and study.

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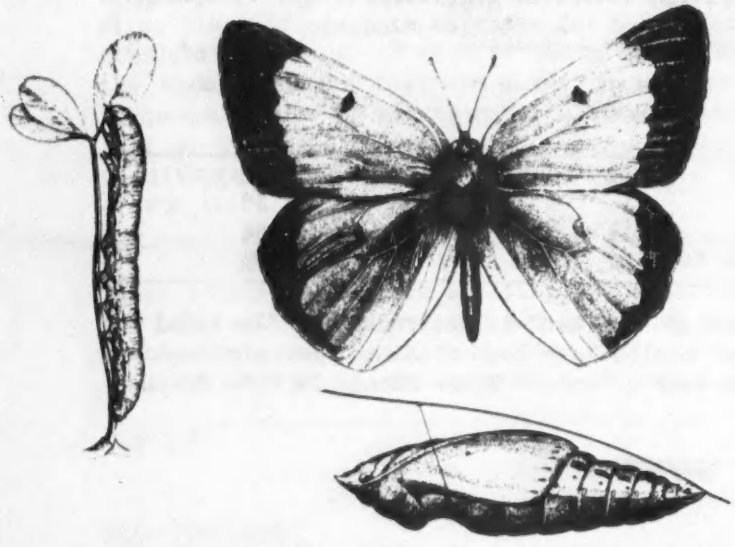
USDA Recommends Methoxychlor To Save Southwestern Alfalfa Crop From Caterpillar Hordes

Growers of alfalfa hay in the Southwest, who often encounter heavy losses due to hordes of alfalfa caterpillars, were recently advised by entomologists of the U. S. Department of Agriculture to use the insecticide methoxychlor to control this pest.

The insect has been a serious threat to hay fields, particularly in southern Arizona and the warm interior valleys of California, sometimes beginning to feed on the crop in early spring. In California's San Joaquin Valley, an emulsifiable concentrate containing methoxychlor, for application by airplane, has been tested with outstanding results for the past several seasons.

Although any farmer can learn to recognize the danger sign -- yellow alfalfa caterpillar butterflies flitting over his young alfalfa -- experts who can predict from this and other evidence what control measures may be necessary can often save growers from heavy crop losses or the expense of ill-timed sprayings. In California, where control programs have been organized in some districts, growers cooperatively employ an entomologist to keep in close touch with infestations of the insect and advise them if and when an insecticide should be applied.



Here are the three growth stages of the alfalfa caterpillar. At left is a full-grown larva feeding on a leaf. These worms change to a pupal stage without spinning a cocoon, by attaching the narrow tail end of the pupa to the alfalfa stalk and throwing a loop of silk about their bodies a little above the middle, which holds the head upright. The pupal stage, shown at lower right, lasts from five to seven days before emergence of the adult butterfly, seen at upper right. Entire under wing surface of the butterfly is sulfur yellow; the upper surface being bordered with black, as shown. On emerging, the butterfly starts laying its 200 to 500 eggs on undersides of alfalfa leaves. In a few days, these hatch into small dark brown worms which soon change to green and are full grown (about 1-1/2 inches long) in from 12 to 15 days. In some states as many as seven generations may occur in a year.

Research Shows The Way

Research carried out by USDA's Bureau of Entomology and Plant Quarantine, cooperating with the California Agricultural Experiment Station, shows that the use of methoxychlor, in combination with early harvest and close, clean mowing, can materially reduce the damage done by this insect.

Among cultural practices, USDA experts point out that early harvest can save the crop when large numbers of caterpillars are threatening to devour it. Close mowing removes the source of food and shelter for both caterpillars and butterflies -- the egg-laying adults. The hot sun will kill most of the caterpillars left on bare soil or short stubble.

Natural Enemies

The following natural enemies of alfalfa caterpillars, which fight on the farmer's side and frequently keep the pest in check are pointed out by the USDA entomologists:

"A virus disease or wilt, that destroys both the worms and the pupae, is generally present in the top soil, stubble, and surface trash where alfalfa is grown in the United States. In California, a spray containing this virus has been used effectively in controlling this pest. Several insects combat the caterpillars, including a small wasp and a fly that develop in the caterpillar's body, and predators that feed directly on the caterpillars."

Since much of the hay crop in these southwestern areas is grown as feed for dairy cattle, methoxychlor has the special advantage of an exceptionally low order of toxicity to warm-blooded animals. In feeding tests, hay from methoxychlor sprayed fields was fed without any secretion of the insecticide in the milk, or storage of it in the fat and tissue of the animals.

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"HOW-TO-DO-IT" BOOKLET SOLVES PAINTING PROBLEMS

A 36-page booklet to cure the headaches often encountered when you wield the paintbrush has been prepared by the Du Pont Company Finishes Division and is now being made available to interested paint splashers of amateur standing.

The booklet tells how to finish walls and ceilings, how to select and apply the proper finish to woodwork, floors, or furniture, and the fine points of exterior painting. A free copy of this liberally illustrated and clearly written manual will be sent at your request. Write the Editor, AGRICULTURAL NEWS LETTER, Du Pont Company, Wilmington 98, Delaware.

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EXPECTING A LATE FREEZE?

Family cars, pick-up trucks, or other farm vehicles still carrying anti-freeze around in their cooling systems may likely become "boiling babies" with rust-choked radiators in the summer weather just ahead.

The experts say all types of anti-freeze should be drained out in the spring, and the cooling system thoroughly flushed to remove all rust. A commercial cleanser should be used if much rust is present at drain-out time, states the National Bureau of Standards. The cooling system should then be refilled with water containing a corrosion inhibitor.

A product which not only inhibits rust, but also neutralizes acids and lubricates moving parts of the water pump, has been developed by the Du Pont Company.

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ORGANIC FUNGICIDES AND LOW-BUSH BLUEBERRY PRODUCTION IN MAINE

By Dr. M. T. Hilborn
Maine Agricultural Experiment Station
Orono, Maine

The low-bush blueberry industry in Maine is unique in that somewhat over 22,000 acres of land are periodically burned, dusted and otherwise cared for to produce about three-fourths of all the native wild blueberries harvested in the U. S. This acreage comprises about two-thirds of the total acreage of all wild and cultivated blueberries in the U. S. The production in 1949, as indicated in the latest agricultural census, showed that almost 9 million quarts were harvested.

The wild low-bush plant in Maine hybridizes freely and new clones (varieties) are constantly being formed. As these originate, the more vigorous soon become established in burned-over land and then become important in blueberry production. Because of this clonal nature, wide variation is shown in disease susceptibility. Some of the more predominant clones are quite subject to plant defoliation which seems to be caused mostly by a disease complex in which leaf rust, (Pucciniastrum myrtilli), and twig and blossom blight, (Botrytis sp.), are among the principal agents.

Defoliation of the plants causes considerable reduction in yield per acre since the berries on such plants may just shrivel up and be worthless, or may drop off entirely. Twig and blossom blight also sometimes causes serious losses, in that plants may die back and not produce blossom buds at all; or if blossoms are produced, the flowers may be blighted and not set fruit. Leaf rust is present in blueberry fields every year, while twig and blossom blight is favored by fairly low temperature and moisture. The extent of this blight will fluctuate, depending upon weather conditions.

New Fungicides Used For Dusting

Dusting for disease control has been a standard practice in blueberry production for about 25 years. Earlier recommendations called for using a 20-20-60 copper sulfate, calcium arsenate, lime dust at the rate of about 50 pounds per acre. In most instances this recommendation proved impractical since growers needed to drive dusting equipment two or more times over an acre of land in order to apply the needed amount of metallic copper per acre. Because of this, most growers were applying much less than the amount of copper needed for disease control and the results were unsatisfactory.

With the advent of the newer organic fungicides, an attempt was made to evaluate these for disease control. The work began in 1947 and was expanded considerably in 1950. It was soon found that some of the dithiocarbamates showed promise as a replacement for 20-20-60 dust.

A dust containing 10% ferbam in the form of "Fermate" fungicide when applied at the rate of 15 pounds per acre showed considerable promise, with the result that it was suggested by the Maine Agricultural Experiment Station at Orono for preliminary trials in 1951. It was recommended in place of 20-20-60

dust in the 1952 dusting schedule. Better disease control was obtained by commercial growers at a much reduced poundage of dust per acre.

These dusts are applied two or three times per season. The first application is made during full bloom if the weather favors Botrytis infection. A second application is then made when about 90% of the petals have fallen and this is followed by a third application 10 to 14 days later. On new-burned land that is not in bearing, one or two dust applications are used. The timing of these depends upon the plant growth and the presence of sufficient foliage to need such protective fungicidal treatment.

Results of 1951 Tests Related

In 1951 a series of small replicate plots was established with some interested growers and 14 fungicides were applied as concentrated mist spray, using all materials at 8x concentration. Plant injury, in the form of leaf burning, was prevalent on the plots treated with inorganic copper, phenyl mercury materials, and the mixed glyoxalidines (Fruit Fungicide 341).

Copper-zinc-chromate (C.C. 658), copper 8-quinolinolate (Bioquin I), copper dimethyl dithiocarbamate, and zineb in the form of "Parzate" fungicide, all showed some control of plant defoliation and increased the yield rate so that the treated plots produced up to 20 bushels per acre more than the untreated controls.

"Phygon," "Cop-O-Zink" and copper mercapto-benzothiazole gave slightly better disease control and yields were increased about 25 bushels per acre over the untreated controls. Ferbam in the form of "Fermate" fungicide, G.C. 1198, G.C. 1124, and ziram in the form of "Zerlate" fungicide, gave the best control, so that increases in yield ranged up to 45 bushels per acre when compared with the untreated controls. This work was done on small plots where plant variation can complicate such yield data. In larger plots of 2 to 4 acres each, ferbam in the form of "Fermate", as a 10% dust, gave increases in yield of 34 to 39 bushels per acre. In these large-scale plots ferbam was the only dust used, but on one of these trials "Phygon" was also included as concentrated mist spray at 8x concentration and resulted in an increase of 14 bushels per acre over the untreated controls.

Drought Caused Reduced Yields Last Year

In 1952 drought injury was quite extensive in blueberry fields and reduced the yield per acre to a marked extent in most fields. Some of the experimental plots were not harvested at all because of drought injury. Other plots, on more favorable land, showed some drought injury and reduced yield, yet differences between treatments were apparent and yield data were obtained.

In one experiment, ziram in the form of "Zerlate" gave an increase of 10 bushels per acre, ferbam in the form of "Fermate" gave an increase of 6 bushels, zineb in the form of "Parzate" gave an increase of 6 bushels per acre over the untreated controls.

In another experiment where drought injury was not quite so severe, ferbam in the form of "Fermate" gave a 19-bushel increase in yield and "Manzate"

fungicide an 11-bushel increase. On land where drought injury was not a factor in yield, ferbam in the form of "Fermate" gave an increase of 45 bushels, thiram an increase of 37 bushels, and C.C. 5400 an increase of 22 bushels per acre.

The use of some of the newer organic fungicides therefore appears promising for the control of certain low-bush blueberry diseases. This work will be continued, particularly with respect to studying the more promising fungicides when applied by various new types of spraying and dusting equipment. Some of the newer types of concentrate mist spray machines may well be adapted to low-bush blueberry production, and may widen the choice of fungicidal materials so that better disease control may result.

NEW FARM CHEMURGIC CHIEF

Members of the National Farm Chemurgic Council at their 18th annual convention in St. Louis in March elected Henry T. McKnight to presidency of the organization, and made Wheeler McMillan, retiring president, the new chairman of the Board of Governors.

Mr. McKnight, farmer and public relations council, is a vice-president of the Forest Farmers' Association, member of the Joint Committee on Grassland Farming, and columnist for the "Breeder-Stockman" magazine. He maintains an office in Washington, where his growing list of public relations clients include many top agricultural and industrial organizations.

Mr. McMillan, new chairman of the board, is widely known as editor-in-chief of "Farm Journal" and "Pathfinder" magazines.

PEST CONTROL COST REDUCED IN WASHINGTON APPLE COUNTRY

"In 1940, spray costs on the average were 27 per cent of the $227 per acre average cost of apple production. Now, at only nine per cent of production costs, they are actually reduced about 90 per cent."

Such was the report of W. J. "Bill" O'Neill, associate entomologist of the Washington State College Tree Fruit Experiment Staff, at a district horticultural meeting held early this year at Wenatchee, heart of the Washington apple country. His figures were taken from a report compiled by the Washington State Apple Commission's research department.

Much of the credit for this reduction in cost of spraying orchards with insecticides and fungicides was given to the chemical industry's research programs which have developed so many better spray materials.

The area free of weeds and grass along this fencerow was treated with CMU weed killer. One spraying kept it clean all summer.

CMU Weed Killer

Clears Fencerows

By
George H. Soule

Close mowing under fences and around posts takes a good man with a scythe or some tricky maneuvering with the mower blade. And the job has to be done repeatedly throughout the growing season.

It's much easier to cover the same area with a CMU spray. CMU is Du Pont's new chemical that kills virtually all weeds and grass and prevents re-growth for an entire season or longer.

Weeds and grass create a summer fire hazard around wooden buildings. Around grain storage structures they shelter rats and vermin which contaminate or destroy grain. On the farm, they provide a steady source of re-infestation for nearby cropland, and a haven for various insects between crops. CMU will do a good job to solve these problems.

The new weed killer comes as a powder, ready to mix with water. A little goes a long way. A cupful in two gallons of water is enough to cover 200 square feet -- or to clean a two-foot swath along 100 feet of fence or 18 inches along about 135 feet. It can be applied with a hand-sprayer or sprinkling can but should be kept thoroughly agitated.

Used in much lower concentrations, the chemical is now recommended for selective weed control in sugar cane and pineapple plantings. Other crop uses are still in the experimental stage.

CMU works through the roots of plants, so it gives best results if applied before plant growth starts, when rain can carry it down into the soil. It takes effect slowly but surely -- under ideal conditions, results may show up within two or three weeks.

With growth already started, first signs of CMU effect are seen in the leaves. The tips and edges begin to die, first on the older leaves and then on the entire plant. Seeds in the soil will not be affected until they begin to sprout. Seedlings often die before they break ground.

The active ingredient in CMU is an organic chemical compound called 3-(p-chlorophenyl)--1,1 dimethylurea. This compound has many safety factors. It offers no toxic hazard to livestock. It shows no tendency to corrode equipment or steel fences, and it's non-flammable. Being non-volatile, CMU does not produce fumes.

As with all chemical weed killers, CMU can damage valuable plants if it is improperly used. It should not be applied where it can possibly get to the roots of such plants, either directly, through drainage, or through irrigation water. It should not be used on lawns, or on walks, driveways or tennis courts from which it could be washed into lawn areas. The sprayer used for weed control should not be used for other spraying jobs. After CMU is applied, the sprayer should be flushed out thoroughly with water before applying any other chemical.

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NEW USES FOR "MANZATE" FUNGICIDE

"Manzate" fungicide, the new member of the dithiocarbamate family introduced by the Du Pont Company a little over a year ago, now goes to market in a new label, with expanded recommendations for control of plant diseases.

Last year this manganese-containing compound was sold exclusively for use on tomatoes and potatoes. The new recommendations, approved but recently, suggest use of the material on a nationwide basis for control of both early and late blights on celery, leaf spot diseases on carrots, downy mildew, purple blotch, and blast on onions.

Other uses are also recommended in specific areas. In California it is proposed for control of shothole fungus disease on both almonds and peaches, and for peach leaf curl on the latter crop. In the Great Lakes region, it is recommended to control black rot on grapes.

The new recommendations result from extensive tests with this fungicide by Federal and State experimental stations, as well as by Du Pont investigators throughout the country.

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Farm products valued at $4,518,156,000 were imported into the United States in 1952, compared with our agricultural exports worth $3,424,738,000.

Over 2,000,000 boys and girls between 10 and 21 years of age belong to 87,000 Four-H Clubs located in almost every rural county of the country.

Dustless Seed Treatment

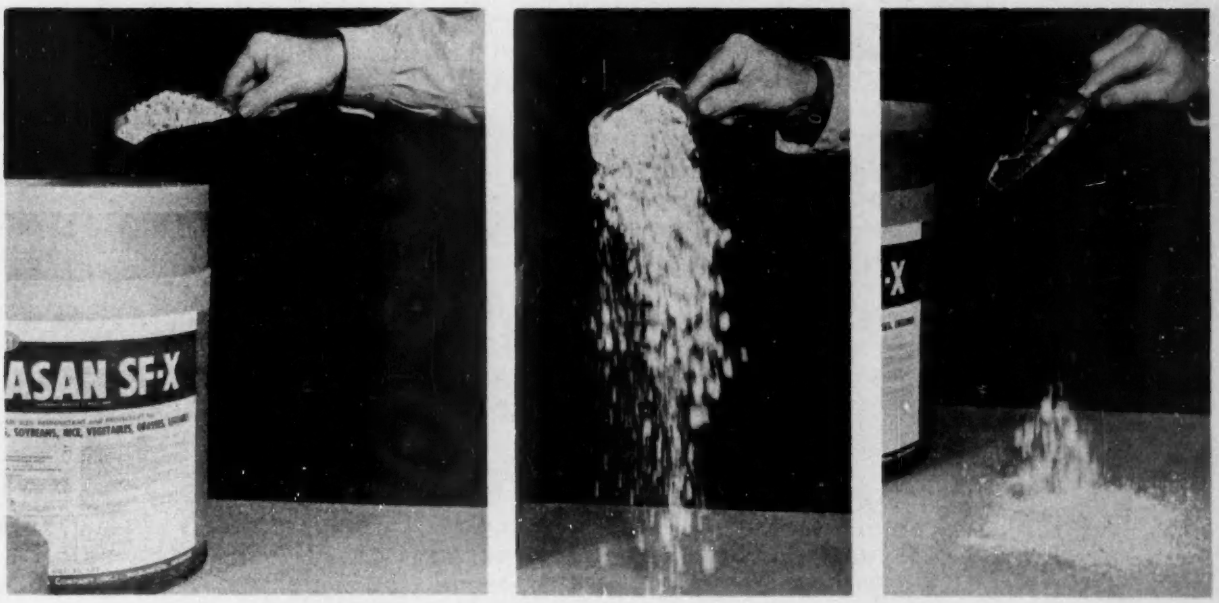
in Farm-Size Container

Because a good many growers chemically treat their own crop seed, the new dustless formulation known as "Arasan" SF-X seed protectant (Agricultural News Letter, March-April 1953) is now being offered in one-third-pound containers, as well as in drums for the use of commercial seed houses and seed processing firms.

The fact that the dust was a potential source of eye, nose, and throat irritation prevented some growers from applying the "chemical overcoat" to protect their seeding from seed-borne and soil-borne disease organisms. For those who now wish to use the new formulation, but where no commercial seed processing facilities are available, or where pre-treated seed is not offered, the third-pound can provides sufficient chemical to treat 100 pounds of grass or small-seeded legume seed, 400 pounds of large seed such as peas, or 140 pounds of medium-size seed such as carrots.

The new "Arasan" formulation is to be applied as a slurry suspension in water. For 100 pounds of grass and legume seed, for example, the third-pound can is mixed thoroughly in a pint of water. Best way to get it on the seed is by revolving both slurry and seed 25 times or more in a barrel-type treater. The suspension may also be sprinkled over the seed on a concrete floor, and the seed immediately stirred vigorously with a hoe or shovel to give complete coverage.

While this slurry application is required for virtually all seed, tiny pasture and hay crop seed may be treated with the dry powder, provided it is used in a mechanical seed blender. Label instructions give the exact amount of water and chemical to be used for each crop.



Pictures above, left to right, show the test that proves new, dustless feature of Du Pont's "Arasan" SF-X seed protectant. This overcomes objections to dustiness of seed treatments.

ILLINOIS CORN GROWERS

Get Annual Bonus of $64 Million
Through Chemical Seed Treatment

The chemical treatment of seed corn has added 42 million bushels to the annual Illinois corn crop -- an increase of about $64 million per year to the income of Illinois corn growers, based on the average prices of the past three years.

These figures are from a report on 1952 Illinois corn tests (University of Illinois Bulletin 564), compiled by the Illinois Agricultural Experiment Station, cooperating with the Illinois State Natural History Survey.

Since practically all corn planted in Illinois is treated, these experimental results were used to estimate the above increases in bushels and dollars due to seed treatment. Illinois harvested the second largest corn crop in its history in 1952 -- about 517 million bushels, or a statewide average of 58 bushels an acre.

Conclusions drawn from seed treatment tests were listed as follows:

"1. The treating of seed corn with the best chemicals developed for the purpose is of enormous value to the state as a whole and of potential benefit to every corn grower. The seeds are protected from fungi that are in the soil and would otherwise enter through broken places in the pericarp, causing the seedlings to blight. Such pericarp damage, often almost microscopic but nevertheless important, results primarily from the mechanical picking and processing of seed corn.

"2. Some new chemicals look very promising and may become competitive with 'Arasan' seed disinfectant (thiram). No chemicals in station tests as yet, however, appear to be consistently superior to this well-known product when the yields obtained by its use are considered.

"3. None of the seed treatments now recommended for corn and none of the favorable looking new ones contain mercury. Within limits those now recommended can be used without harm and may sometimes be beneficial at dosages higher than those prescribed by the manufacturer.

"4. Ordinarily corn planted early, when the soil is cold, derives more benefit from seed treatment than corn planted later, when the soil is warm. In 1952, however, just as good results were obtained from treatment in the June 2 plantings, which came up in six days, as from plantings made a month earlier, which did not emerge for two weeks.

"What happened is that soon after the first planting, the soil became wet for considerable time. The later planting was made as soon as the soil could be reworked. A somewhat similar condition occurred in 1946, when the soil was wet throughout May and the seed for the treatment test could not be planted until June 3. The seedlings emerged in six days, indicating that the soil was fairly warm. Regardless of late planting that year, remarkable increases in yield from treatment were obtained."

DU PONT

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